REMARKS

Applicants respectfully request the Examiner to take note that Applicants' claims, and especially independent Claim 1, are significantly narrowed in response to the Examiner's new grounds of rejection. Specifically, Claim 1 is narrowed to recite the use of only inorganic peroxide and to cause step c) to be carried out prior to carrying out of step d).

Claims 1-3, 12-16, 23-25, 27-28, 32, and 33 have been rejected under 35 USC 102(b) as being anticipated by Sadeghi et al. ("Sadeghi")(US 4,765,885). This rejection is respectfully traversed.

The Examiner holds that Sadeghi discloses all of Applicants' claimed steps, and further holds that benzoyl peroxide disclosed by Sadeghi is the functional equivalent of hydrogen peroxide and sodium peroxide in Applicants' claimed invention.

Applicants respond that the Examiner has picked and chosen through the disclosure of Sadeghi and has ignored the substance of Sadeghi's invention which is very different from Applicants' invention and does not anticipate Applicants' invention in any way.

Sadeghi's invention is directed to treatment of tar sands by an intense ultrasonic source in an aqueous slurry to free bitumen globules therefrom, and does not require a peroxide to carry out the method. Sadeghi states (column 3 lines 60-68: "...the invention separates bitumen from tar sands, utilizing a separation agent formed by reacting tar sands with an inorganic base...When the solution is subjected to ultrasonic energy, the lighter non-polar hydrocarbon fraction of the bitumen progressively separates from the sand particles and rises to the surface." The preferred inorganic bases are sodium silicate and sodium carbonate. Organic peroxides such as benzoyl peroxide are disclosed to be free-radical generators and thus process

accelerants.

The Sadeghi reaction requires alkaline conditions to proceed (column 21 lines 4-10): "The fourth experiment was to examine whether benzoyl peroxide can work alone without pH adjustment. The pH of the solution was 6.65, little bitumen was dissolved into the aqueous phase after twenty minutes of insonation. It indicated that alkaline environment is critical to recovering bitumen in the process of the invention."

Sadeghi demonstrates conclusively (column 18 line 67 to Column 21 line 29) that the process proceeds via free-radical attack on the inorganic base which then reacts in the organic phase with the bitumen. The free radicals are generated by intense ultrasonic insonation; no reaction occurs in the absence of such insonation. Sadeghi notes that addition of free-radical initiators speeds the process and cites benzoyl peroxide and azoisobutyronitrite as "representative agents" although free-radical initiators are not a requirement to perform the principal method of Sadeghi's invention. Sadeghi notes further that "preferred materials are soluble in the organic phase" as would be necessary for reactions proceeding by free-radical addition, as is well known in the art of free-radical organic chemistry. Sadeghi does not suggest to use any inorganic peroxide, as would be preferentially and highly soluble in aqueous solution, and in fact teaches away from use of such materials which are substantially insoluble in the organic phase.

Further, as is well known to those of ordinary skill in the organic chemical arts, there is no oxygen bubble formation during insonated free-radical generation by an organic free-radical generator such as benzoyl peroxide. The oxy and hydroxy radicals are consumed in reaction with the organic (bitumen) substrate. Cavitation bubbles of air and water vapor may occur in the slurry in response to ultrasonic irradiation, but they are unrelated to peroxide decomposition.

Applicants' invention, on the other hand, is directed to release of bitumen from tar sand grains by the mechanical action

of oxygen bubble formation in the aqueous phase on the surface of the mineral particulate within the sand grain. The oxygen bubbles are formed by decomposition of an inorganic peroxide such as hydrogen peroxide or sodium peroxide which is highly soluble in the aqueous phase. No free-radicals are formed in the aqueous phase, and no insonation is required, as in Sadeghi. Organic peroxides such as benzoyl peroxide and azoisobutyronitrite are useless in Applicants' claimed aqueous process, and are not disclosed or recited in Applicants' application.

Applicants have amended the Specification at page 15 line 13 to positively recite that hydrogen peroxide and sodium peroxide are inorganic peroxides, which recitation only affirms what is well known in the prior art and therefore does not add new matter to the application. Claims 1,4,8, and 10 are amended to clarify their scope to only inorganic peroxides.

Therefore, Sadeghi's use of organic peroxides such as ultrasonically-irradiated benzoyl peroxide to promote free-radical attack on bitumen in the organic phase of an alkaline slurry does not anticipate Applicants' use of non-irradiated inorganic peroxides to generate oxygen bubbles in the aqueous phase of a neutral slurry. Applicants respectfully submit that the rejection of Claims 1-3, 12-16, 23-25, 27-28, 32, and 33 under 35 USC 102(b) as being anticipated by Sadeghi et al. ("Sadeghi")(US 4,765,885) is not supported and request that it be removed.

Claims 1-4,6-16,23-25,and 27-3333 have been rejected under 35 USC 103(a) as being unpatentable over SU 1685534 A1 ("SU") in view of Sadeghi et al. ("Sadeghi"). This rejection is respectfully traversed.

The Examiner holds that SU "discloses the claimed invention except for the shearing by agitation being done with a rotary mixer...Sadeghi discloses that a rotary mixer is a common type of device for shearing by agitation..." and that therefore it would have been obvious to combine these teachings to arrive at

Applicants' claimed invention.

Applicants respond that independent Claim 1 is amended to recite that (step c) shearing is carried out for at least one minute prior to carrying out step d, which step is the addition of peroxide to the slurry. An examination of both SU and Sadeghi shows that neither of these discloses to shear the slurry for at least one minute prior to introduction of peroxide into the slurry.

Further, SU discloses to "mix" (translation page 4 line 20) or "agitate" (page 5 line 22; page 6 line 6; page 6 line 13) the slurry for a period of time prior to addition of peroxide. However, SU does not define what is meant by mixing and agitation. The Examiner in his rejection relies on the disclosure of Sadeghi as being definitive of a rotary mixer suitable for use in Applicants' claimed invention. The Examiner goes so far as to hold that "Sadeghi et al. disloses that a rotary mixer is a common type of device for shearing by agitation." However, Applicants submit that such is simply not the case. Sadeghi recites and illustrates (FIG. 1, item 35) that "the tank may optionally contain a low RPM mixer 35 to maintain movement of the suspension past the transducers 18." This is hardly "shearing by agitation."

Thus, neither SU nor Sadeghi teaches or anticipates the need for, or benefit of, high-intensity shearing of the slurry as disclosed and claimed by Applicants at page 13 line 5 through page 15 line 6. The term "shearing" as used in Claim 1 and again in dependent Claims 12-15 is clearly defined by Applicants and far exceeds the level of shear that might be produced by the ordinary low-RPM mixing apparatus cited by the Examiner. Indeed, neither SU nor Sadeghi suggests or discloses that high-intensity shear of the slurry may be beneficial, as novelly disclosed and claimed by Applicants.

For this reason, Applicants respectfully submit that the rejection of Claims 1-4,6-16,23-25,and 27-3333 under 35 USC 103(a) as being unpatentable over SU 1685534 A1 ("SU") in view of

Sadeghi et al. ("Sadeghi") is not supported and should be withdrawn.

Regarding Claims 4,6, and 7, the Examiner holds that it would have been obvious to further treat the tar sands layer if it still contained some bitumen, and that it would have been obvious to repeat method steps.

Regarding Claims 8 and 9, the Examiner holds that it would have been obvious to treat the froth layer if it still contained sand, and that it would have been obvious to treat it the same way as the first time.

Regarding Claims 29-31, the Examiner holds that it would have been obvious to sieve the sand.

Applicants respond that Claims 4,6,7,8,9,29,30,and 31 all depend from Claim 1 which has been shown above to be patentably distinct from the cited prior art disclosure of Sadeghi. Therefore, discussion of the dependent claims is moot.

Claims 17-22 have been rejected under 35 USC 103(a) as being unpatentable over SU 1685534 A1 ("SU") in view of Sadeghi et al. ("Sadeghi") and further in view of Luft et al. ("Luft"). This rejection is respectfully traversed.

The Examiner holds that SU and Sadeghi teach Applicants' method but fail "to teach increasing pressure to be a gauge pressure of 1 to 5 atmospheres...and Luft discloses a method of cleaning a medium contaminated with organic constituents...at a pressure range of approximately 2 to 19 gauge pressure."

Applicants respond that Claims 17-22 depend from Claim 1 which has been shown above to be patentably distinct from the cited prior art disclosure of Sadeghi. Therefore, discussion of the dependent claims 17-22 is moot.

Claims 8,9,and 29-31 have been rejected under 35 USC 103(a) as being unpatentable over Sadeghi et al. ("Sadeghi").

Regarding Claims 8,9, the Examiner holds that it would have

been obvious to further treat the froth layer containing bitumen and oil.

Regarding Claims 29-31, the Examiner holds that it would have been obvious to sieve the sand in a rotary trommel.

Applicants respond that Claims 8,9,29-31 depend from Claim 1 which has been shown above to be patentably distinct from the cited prior art disclosure of Sadeghi. Therefore, discussion of the dependent claims is moot.

Claims 4,6,7,10, and 11 have been rejected under 35 USC 103(a) as being unpatentable over Sadeghi et al. ("Sadeghi") in view of Everett et al. ("Everett"). This rejection is respectfully traversed.

Regarding Claims 4,6,7, and 10, the Examiner holds that Sadeghi discloses all Applicants' claimed steps "but fails to disclose using hydrogen peroxide instead of benzoyl peroxide and further treating his removed clean tar sands layer...Everett teaches cleaning soild contaminated with oil which includes adding an aqueous hydrogen peroxide solution to the soil to form an aqueous slurry that includes either benzoyl peroxide or hydrogen peroxide (claim 14). Therefore, since Sadeghi and Everett disclose similar processes...it would have been obvious (in the invention of Sadeghi) to use hydrogen peroxide instead of benzoyl peroxide."

Applicants respond that both the processes of Sadeghi and Everett rely on high-intensity ultrasonic insonation of an alkaline slurry containing a peroxide to produce free radicals which attack organic compounds in the slurry. As such, they neither disclose nor suggest Applicants' claimed invention.

Sadeghi insonates an organic peroxide to produce free radicals that react with an inorganic base such as sodium silicate to produce a reactive intermediate that attacks bitumen.

Everett insonates a peroxide, either benzoyl peroxide or hydrogen peroxide, in an alkaline medium to produce free radicals that react with a polar-substituted hydrocarbon such as a

polychlorinated biphenyl to produce a micellular surfactant.

Applicants' process, on the other hand, a) does not use ultrasonic insonation; b) does not rely on, or operate through, generation of free radicals; c) does not rely on an alkaline medium; and d) does not attack or degrade organic compounds such as bitumen. Applicants submit that the processes of Sadeghi and Everett are entirely different from Applicants' claimed process, and that therefore the teachings of Sadeghi and Everett are irrelevant to Applicants' invention. Taken either separately or together, the teachings of Sadeghi and Everett would not lead one of ordinary skill in the art to Applicants' claimed invention nor to the use of an inorganic peroxide in the method of Applicants' claimed invention.

For these reasons, Applicants respectfully submit that the rejection of Claims 4,6,7, and 10 under 35 USC 103(a) as being unpatentable over Sadeghi et al. ("Sadeghi") in view of Everett et al. ("Everett") are not supported and should be withdrawn.

Regarding Claim 11, the Examiner holds that Sadeghi discloses all of Applicants' claimed elements except tempering the slurry to about 80°C; that Everett teaches a range of temperatures including about 80°C; and that it would be obvious to combine the teachings of Sadeghi and Everett to arrive at Applicants' invention as claimed in Claim 11.

Applicants respond that Claim 11 depends from Claim 1 which has been shown above to be patentably distinct from the cited prior art disclosure of Sadeghi. Therefore, discussion of the dependent claim 11 is moot and the rejection should be withdrawn.

Claims 17-22 have been rejected under 35 USC 103(a) as being unpatentable over Sadeghi et al. ("Sadeghi") in view of Luft et al. ("Luft"). This rejection is respectfully traversed.

The Examiner holds that Sadeghi dicloses all of Applicants' claimed elements except increasing pressure to a gauge pressure of 1 to 5 atmospheres; that Luft teaches a cleaning method including a pressure range of approximately 2 to 19 gauge

pressure; and that it would be obvious to combine the teachings of Sadeghi and Luft to arrive at Applicants' invention as claimed in Claims 17-22.

Applicants respond that Claims 17-22 depends from Claim 1 which has been shown above to be patentably distinct from the cited prior art disclosure of Sadeghi. Therefore, discussion of the dependent claims 17-22 is moot and the rejection should be withdrawn.

Applicants respectfully request that the amendments and remarks presented herein be entered into the case to position the claims in better form for consideration on Appeal.

Respectfully submitted,

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